CLAIMS

1. Device for spatial modulation of a light beam, comprising a Polymer Dispersed Liquid Crystal (PDLC) element, said element comprising at least two areas that can be addressed independently of each other using a system with at least two electrodes,

characterised in that said electrodes have a predetermined non-linear pattern chosen so as to reduce the sensitivity of said device to polarisation, due to the appearance of at least one transverse electrical field between said electrodes,

and in that it also comprises optical means for reducing the sensitivity to polarisation comprising at least one anisotropic phase delay plate.

2. Device according to claim 1, characterised in that said predetermined pattern has a zero average.

3. Device according to either claim 1 or 2, characterised in that said liquid crystal is of the nano-PDLC type, droplets of said liquid crystal dispersed in said polymer having a diameter of between approximately 10 and 100 nm.

4. Device according to any one of claims 1 to 3, characterised in that said predetermined electrode pattern is sinusoidal.

5. Device according to any one of claims 1 to 4, characterised in that said predetermined electrode pattern is a saw tooth pattern.

6. Device according to any one of claims 1 to 5, characterised in that it has a reflection configuration and in that said phase delay plate is a quarter-wave plate.

7. Device according to claim 6, characterised in that, said system with at least two electrodes also comprising at least one counter electrode, said quarter-wave plate is oriented at approximately 45° from the direction of said electrodes, and is inserted between said counter electrode and a mirror.

8. Device according to any one of claims 1 to 5, characterised in that it has a configuration in transmission and in that said phase delay plate is a half-wave plate.

9. Device according to claim 8, characterised in that said half-wave plate is inserted between two adjacent liquid crystal elements.

10. Device according to any one of claims 1 to 5, 8 and 9, characterised in that it has a configuration in transmission and comprises:

- two linear birefringent prisms, mounted top to bottom,
- a first half-wave plate oriented at approximately 45° from the direction of said electrodes,
- a second half-wave plate located on an optical path of a refracted order of said beam at the output of one of said prisms,

said liquid crystal element being inserted between said prisms.

11. Device according to claim 10, characterised in that it also comprises means of collimation of said beam at the input and output of said prisms.

12. Device according to any one of claims 1 to 7, characterised in that it has a configuration in reflection and comprises:

- a linear birefringent prism,
- a half-wave plate located on an optical path of a first refracted order of said beam at the output from said prism,
- delay means located on an optical path of a second refracted order of said beam at the output from said prism,
- a mirror,

said liquid crystal element being located between said mirror and an assembly comprising said prism, said plate and said delay means.

13. Device according to claim 7, characterised in that it also comprises:

- two linear birefringent prisms mounted top to bottom,
- a polarisation separator cube connecting said prisms,
- two half-wave plates arranged on an extraordinary output and an ordinary input of said prisms, respectively,

said liquid crystal element being located between said quarter-wave plate and said polarisation separator cube.

14. Device according to any one of claims 1 to 13, characterised in that, said system with at least two electrodes also comprising at least one counter electrode, said counter electrode comprises at least two electrodes each divided into at least two elementary areas called pixels.

15. Device according to any one of claims 1 to 14, characterised in that said at least two areas of said liquid crystal element are each divided into at least two sub-areas in a direction orthogonal to the direction of alignment of said areas.

16. Device according to any one of claims 1 to 15, characterised in that it comprises means of controlling the addressing voltages of said sub-areas, enabling complementary reduction of the sensitivity of said device to polarisation.

17. Device according to claim 16, characterised in that said control means maximise addressing voltage differences between two adjacent sub-areas.

18. Device according to claim 17, characterised in that two adjacent sub-areas have alternating addressing voltages.

19. Device according to claim 16, characterised in that said control means minimise addressing voltage differences between two adjacent sub-areas.

20. Device according to claim 19, characterised in that the addressing voltages of said sub-areas are staged approximately uniformly.

21. Applications of the device according to any one of claims 1 to 20 in fields belonging to the group comprising:

- attenuation of a light beam,
- a at least partial phase shift of a light beam,
- spectrum equalisation,
- shaping of light beams,
- design of variable delay lines,
- design of tuneable filters,
- selection of spectral bands,
- Optical Add Drop Multiplexers (OADM).